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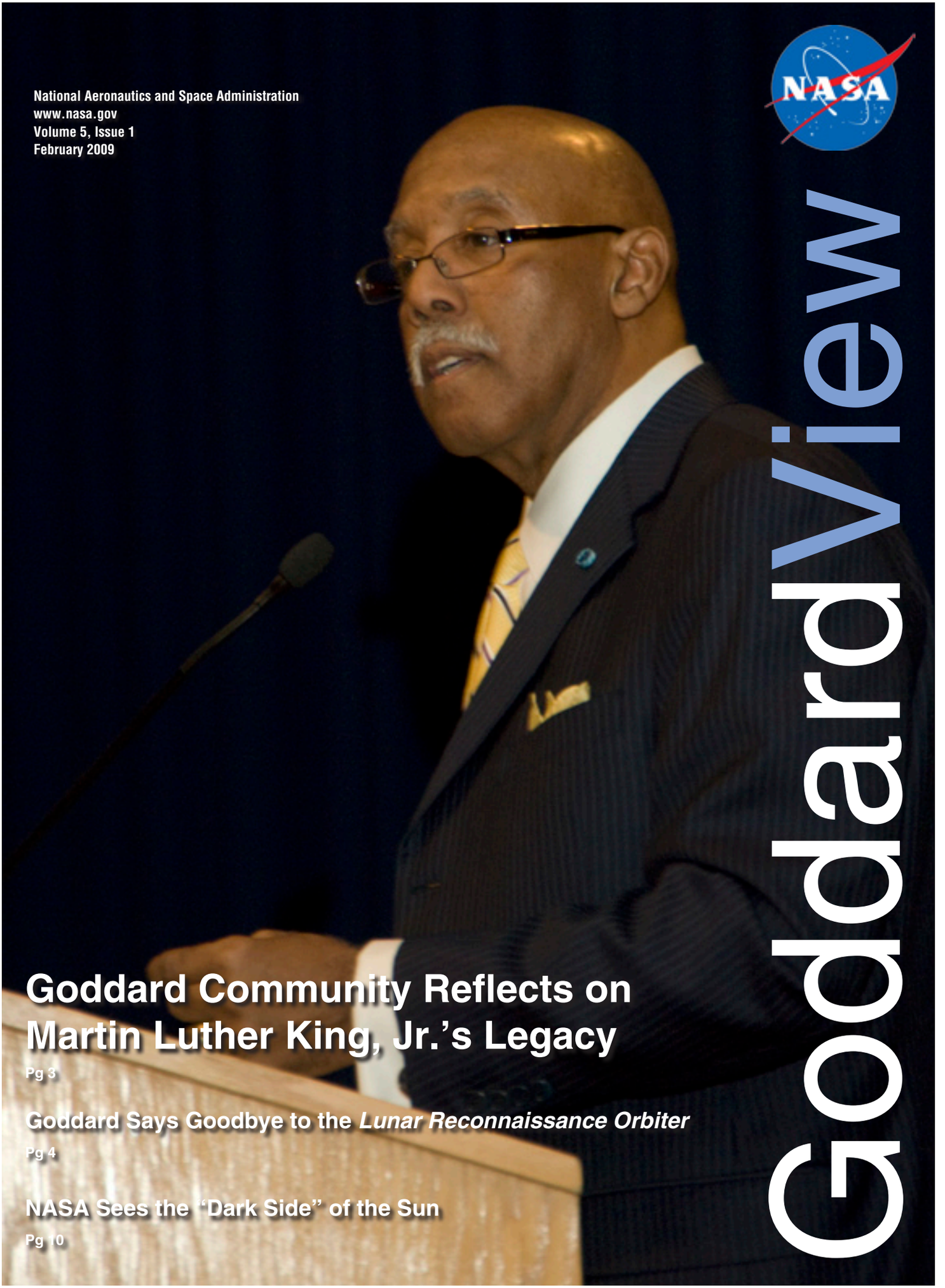

Goddard Community Reflects on Martin Luther King, Jr.'s Legacy

Pg 3

Goddard Says Goodbye to the *Lunar Reconnaissance Orbiter*

Pg 4

NASA Sees the "Dark Side" of the Sun

Pg 10

Goddard Gets First Snow of 2009

Photos by Pat Izzo

On January 28, Goddard was treated to the year's first snowfall. So significant was the snow and ice accumulation that Goddard was under a Code Yellow and opened two hours late.

For more information on Goddard's snow plan and Center operating status codes, visit: http://code220.gsfc.nasa.gov/Snow/Snow_Announcement.PDF. ■

Photo credit: Pat Izzo

Caption: Cobe Road.

Photo credit: Pat Izzo

Caption: Workers get ready to clear snow and ice from Goddard parking lots, roads, and sidewalks.

Photo credit: Pat Izzo

Caption: Snow plows stand ready to get to work.

Table of Contents

Cover caption: Dr. Julian M. Earls, former Director of NASA's Glenn Research Center, addresses Goddard employees at the Dr. Martin Luther King activities in the Building 8 auditorium.

Photo credit: Bill Hrybyk.

GoddardView Info

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Deadlines: News items and brief announcements for publication in the Goddard View must be received by noon of the 1st and 3rd Wednesday of the month. You may submit contributions to the editor via e-mail at john.m.putman@nasa.gov. Ideas for new stories are welcome but will be published as space allows. All submissions are subject to editing.

Goddard Community Reflects on Martin Luther King, Jr.'s Legacy

By Dewayne Washington

On January 29, the Goddard community gathered in the Building 8 auditorium to listen, reflect, laugh, sing, and dance in celebration of the life and legacy of Dr. Martin Luther King, Jr. It was a celebration that brought out some of the best NASA has to offer in cooperative spirit and talent.

The commemoration is the vision of Tonjua Hines-Watts, Chairperson of the African-American Advisory Committee, who worked to establish a program reflective of the true spirit of Dr. King's ideology. Watts says she is very proud of the diversity and cooperation within the Goddard community, which has become a hallmark of this annual celebration.

Mistress of Ceremonies, Theresa Stevens, in collaboration with Goddard neighbors, presided over a two-hour program of reflection, encouragement, inspiration, and challenge. Following the posting of colors by the Eleanor Roosevelt High School Color Guard, Goddard astrophysicist Kim Weaver sang the National Anthem.

"In his historic march on Washington, Dr. King spoke of his dream that his children would one day live in a nation where they would be judged not by the color of their skin, but the content of their character," reflected Robert Strain, Goddard Center Director. "And just a few days ago, Dr. King's children watched as America's first elected African-American president took the Oath of Office." Strain spoke of a Center-wide commitment of equality for all. "I am personally committed to ensuring everyone at Goddard is treated fairly…and will be judged only by the strength of their ideas."

U.S. Senator Barbara Mikulski sent a letter of appreciation in recognition of Goddard's celebration. "I am so grateful for the exceptional service you provide," read Christina Salker, a member of the Senator's staff. "NASA is a source of pride and unparalleled technological achievement for the American people, and our space program is vital to the study of our universe and our planet," Mikulski wrote.

No stranger to Goddard, Dr. Julian Earls, former Center Director of NASA's Glenn Research Center, was the keynote speaker. Internationally recognized for his oratorical skills, Earls began by reflecting on those who had paved his way: his sharecropper grandfather from North Carolina; his mother, who scrubbed floors and worked in kitchens to assist in supporting a family of 13; and his father, a country preacher who also worked for the railroad. "Dad said, 'Get enough education so that you don't have to look up to anyone,'" Earls remembered. "'Then get a little more so that you don't have to look down on anyone either.'"

Earls spoke of growing up poor with 10 siblings and wearing hand-me-down everything. "I once wore shoes with soles so thin if I stepped on a dime I could tell you if it were heads or tails," Earls said with a laugh.

"I am honored to be come back to Goddard," said the NASA retiree, "Honored to stay in touch with my first love." He spoke about his humility to be invited, "Because it is unusual for a man of science to be asked to address non-technical topics." Earls congratulated the audience for taking the time to recognize what Dr. King stood for, and recognized Goddard's senior management for deeming such a celebration worthy.

His one request of the audience was to make a firm commitment to help our youth. "If you want to receive much you must first learn to give," said Earls of Dr. King's teachings. "You will find yourself rewarded in far greater proportion than you have ever given."

Earls also challenged Goddard community members about their work habits. "I know the kind of people you are, you set higher standards than anyone sets for you," he said. "But treat yourself nicely on occasions."

In his final thoughts, Earls compared taking care of yourself in the same regard as following emergency instructions presented each time you board a plane. The instructions insist you must first don your mask before attempting to help others. "You can extrapolate that to life," Earls insisted. "You cannot take care of anyone else until you first take care of yourself."

Musical performances then followed by the Kenmoor Middle School Concert Choir and the Bokamoso Youth Program from Winterveld, South Africa. They left the Goddard audience dancing at their seats and received a standing ovation.

Photo credit: Bill Hrybyk

Caption: Singers from the South African Bokamosa Program.

This year's program was the culmination of months of thoughtful preparation by a diverse group of Goddard community members committed to inspiring a cooperative spirit of celebration reflective of Dr. King's dream.

In his closing remarks, Strain acknowledged Dr. King's legacy, but spoke of some unfinished work. "This is a timely reminder of the challenges we still have ahead of us as a Center, as an Agency, as a Nation." ■

Goddard Says Goodbye to the *Lunar Reconnaissance Orbiter*

By John Putman

On January 28 and again on February 3, Goddard employees and other visitors got to say their goodbyes to the *Lunar Reconnaissance Orbiter* (LRO).

According to Deputy Project Manager Cathy Peddie, "We received so many compliments not only on LRO, but on all our friendliness and willingness to put on this event. So many families and employees braved the icy conditions to see LRO today. We were thrilled and very, very proud."

On February 10, at 2:55 a.m., LRO left its home at Goddard for the warmer climes of Kennedy Space Center. On February 13, LRO arrived at Kennedy Space Center and is currently in the Astrotech Space Operations Payload Processing Facility. ■

Photo credit: Pat Izzo

Caption: LRO gets loaded onto the trailer destined for Florida.

Photo credit: Debora McCallum

Caption: LRO Depury Project Manager Cathy Peddie describes the LRO mission to Goddard employees and other visitors.

Photo credit: Giulio Rosanova

Caption: LRO takes a break at a truck stop in Selma, N.C.

Photo credit: Debora McCallum

Caption: Phil Leurs shows a piece of space hardware to some visiting school children.

Photo credit: Katheryn Vasquez

Caption: LRO arrives at Kennedy Space Center.

National Academy of Sciences Honors Goddard Astrophysicist for Science Contributions

By Rob Gutro and Francis Reddy

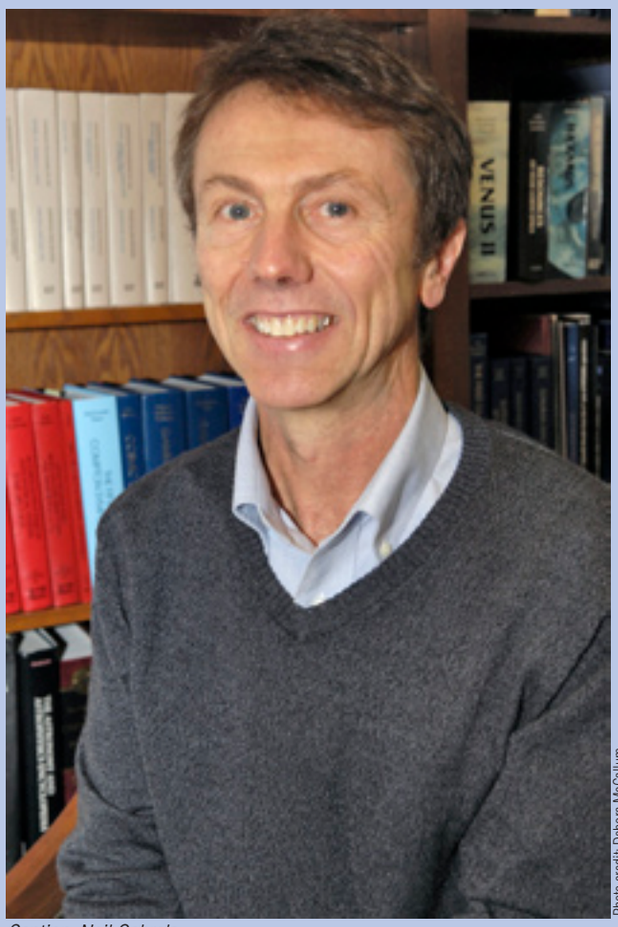


Photo credit: Debora McCallum

Caption: Neil Gehrels

Goddard astrophysicist, Dr. Neil Gehrels, has been awarded the Henry Draper Medal by the National Academy of Sciences (NAS).

NAS will honor 18 individuals in 2009 with awards recognizing extraordinary scientific achievements in the areas of biology, chemistry, geology, astronomy, social sciences, psychology, and applications of science for the public good.

One of those recipients is Goddard's Neil Gehrels, who is the recipient of the Henry Draper Medal. Gehrels, Chief of the Astroparticle Physics Laboratory at Goddard, is being honored for his pioneering contributions to gamma-ray astronomy. His leadership of the *Compton Gamma Ray Observatory* (CGRO) and the *Swift* mission has led to new insights into the extreme physics of active galactic nuclei and gamma-ray bursts. The Henry Draper Medal and a prize of $15,000 are awarded for original investigation in astronomical physics.

"I am thrilled to receive the Draper award. It is a great recognition for the wonderful science from *Swift*, *Fermi*, and CGRO, and the years of hard work from the teams that built these satellites," Gehrels said.

Gehrels serves as Principal Investigator of NASA's *Swift* mission, and Deputy Project Scientist of NASA's *Fermi Gamma-ray Space Telescope*. Since its launch on November 20, 2004, *Swift* has greatly advanced astronomers' understanding of powerful stellar explosions known as gamma-ray bursts. *Fermi* launched in June 2008 and has already discovered a dozen new pulsars. During the 1990s, Gehrels served as the Project Scientist for CGRO, the second of NASA's four "Great Observatories" and pioneered observations of the gamma-ray sky.

Gehrels earned his Ph.D. in physics from the California Institute of Technology in 1981, and came to Goddard as a postdoctoral researcher in the same year. Among his many honors, Gehrels and his *Swift* science team won the 2007 Rossi Prize from the American Astronomical Society's High-Energy Astrophysics Division. He is also the 2005 recipient of Goddard's John C. Lindsay Memorial Award for Space Science. Gehrels was elected to the American Academy of Arts & Sciences in 2008. He is a Fellow of the American Physical Society and an adjunct professor of astronomy at the University of Maryland and of astronomy and astrophysics at The Pennsylvania State University.

The National Academy of Sciences is a private, nonprofit honorific society of distinguished scholars engaged in scientific and engineering research, dedicated to the furtherance of science and technology, and to their use for the general welfare. Since 1863, the NAS has served to, "investigate, examine, experiment, and report upon any subject of science or art," whenever called upon to do so by any department of the Government.

The award will be presented at the April 26 awards ceremony, which will take place during the NAS's 146th annual meeting at the Academy's headquarters in Washington, D.C.

For information about *Fermi*, please visit: http://www.nasa.gov/fermi.
For information about *Swift*, please visit: http://www.nasa.gov/swift.
For information about the National Academy of Sciences, visit: http://www.nasonline.org. ■

NOAA-N Prime Gives NOAA and NASA a Fresh Look at the Weather, Climate, and More

By Adam Voiland

On February 6, NASA launched *NOAA-N Prime*, the last in a productive series of 41 polar-operational environmental satellites (POES) that date back to 1960. As it has for other satellites in the series, NASA's Goddard Space Flight Center in Greenbelt, Md., managed the development and launch of the mission, and will transfer operational control to the National Oceanic and Atmospheric Administration (NOAA) 21 days after launch.

NOAA-N Prime's main objective is to gather critical meteorological data to aid weather forecasting. As it orbits Earth once every 102 minutes, the satellite will collect global images of cloud cover and surface features, as well as temperature and humidity profiles over sea and land. Meteorologists use such data to make short-term weather forecasts and to monitor longer-term meteorological trends such as the cycles associated with El Niño and La Niña. In addition, climatologists can use the data to better understand and quantify Earth's changing climate patterns.

To carry out its objective, the bus-sized spacecraft carries a suite of eight instruments, including an advanced, very high resolution radiometer that will image surface features, such as vegetation and bodies of water; a high resolution infrared radiation sounder that will generate temperature and moisture profiles; two advanced microwave sounding units primarily for atmospheric and temperature profiles; and a microwave humidity sounder that will measure atmospheric moisture and precipitation rates.

Beyond its core meteorological and climate missions, *NOAA-N Prime* carries instruments to collect other useful data. A space weather instrument called the Space Environment Monitor (SEM-2), for example, allows scientists to monitor potentially damaging electrons and protons in solar wind streams that can harm satellites.

NOAA-N Prime also carries components of the international Search and Rescue Satellite-Aided Tracking (SARSAT) system. The system relays distress signals from aviators, mariners, and other individuals in remote locations through satellite-to-ground stations capable of dispatching rescue teams. Since SARSAT's creation in 1982, the system is credited with saving the lives of more than 24,500 people. Enhancements in the SARSAT system will improve locating accuracy to within 100 meters, as opposed to 2- to 3 miles with previous systems.

Although nearly identical to *NOAA-N* (its immediate predecessor), *NOAA-N Prime* has some notable new technologies. Engineers have added a deployable antenna that enhances the spacecraft's Data Collection System (DCS) designed to collect environmental data from unmanned buoys, instrument platforms, and balloons—as well as tagged animals—and relay it to scientists on the ground. The new Advanced DCS can send signals to individual beacons on the ground, allowing mission controllers to remotely modify beacon performance, or turn them off to conserve power during idle times.

Photo credit: Carleton Bailie

Caption: A United Launch Alliance Delta II rocket carrying NOAA-N Prime *blasts off from Space Launch Complex-2 at Vandenberg AFB, Calif.*

NOAA-N Prime also highlights the increasing role of international collaboration in weather and environmental monitoring. In an agreement with the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT), NOAA agreed to carry EUMETSAT's microwave humidity sounder on *NOAA-N Prime*, while EUMETSAT agreed to carry NOAA instruments aboard a series of European-built Meteorological Operational (MetOp) satellites.

Built by Lockheed Martin Space Systems, *NOAA-N Prime* was launched from the Western Range at Vandenberg Air Force Base by a United Launch Alliance two-stage Delta II rocket. The launch was managed by NASA's Launch Service Program at the Kennedy Space Center, Cape Canaveral, Fla. The satellite will send back data to NOAA's Command and Data Acquisition centers in Fairbanks, Alaska, and Wallops Island, Va.

The launch of *NOAA-N Prime* marks the end of a key chapter in the history of weather satellites. For decades, NASA has planned and launched weather satellites before handing them over to NOAA for operations. Under a new system, a tri-agency Integrated Program Office—including the Department of Defense, NOAA, and NASA—will manage the next generation of satellites.

"It's a bit sad to see this extremely successful program come to an end," said Mary Walker, Deputy Project Manager of the Polar Operational Environmental Satellites program. "For nearly 50 years, NOAA and NASA have worked extremely well together on weather satellites." ■

Goddard Astrophysicist Wins Joseph Weber Award

By Rob Gutro and Francis Reddy

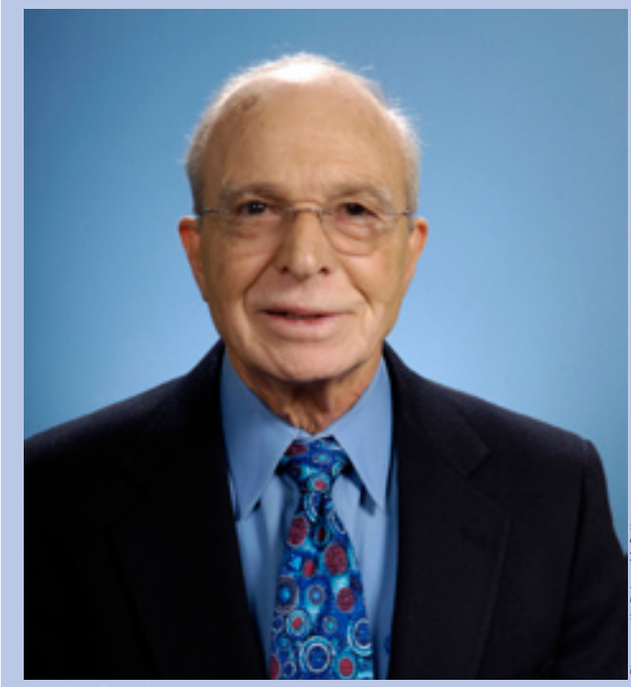


Photo credit: Debora McCallum

Caption: Peter Serlemitsos.

A Goddard astrophysicist is the recipient of the Joseph Weber Award for Astronomical Instrumentation, recently announced by the American Astronomical Society.

The Joseph Weber Award for 2009 was conferred on Dr. Peter Serlemitsos in January in recognition of his innovative contributions to X-ray detector and telescope designs that have enabled decades of scientific advances in high energy astrophysics. The full citation for the Joseph Weber Award gives details of two landmark inventions by Serlemitsos—in detector design and thin-film X-ray optics—and mentions many space missions that his advances have benefited.

"The award was given to me for my contributions to two technologies, both relating to the development of instruments for observations in the field of X-ray astronomy," Serlemitsos said. "My involvement in these spanned almost my entire career (over 45 years) at Goddard."

The Joseph Weber Award for Astronomical Instrumentation is awarded by the American Astronomical Society to an individual for the design, invention, or significant improvement of instrumentation leading to advances in astronomy. It is named after physicist Joseph Weber. The awards tend to be for a career of instrument development rather than a single specific device.

Serlemitsos said, "I feel very happy and honored to receive this award. The opportunity that NASA presented to me in 1962 when I joined Goddard was immense." He began his career at Goddard while still in graduate school and almost at the same time as the emergence of the new discipline.

After graduating from the University of Maryland in 1966, Serlemitsos worked as an astrophysicist at the X-ray Astrophysics Laboratory at Goddard, joining Elihu Boldt, the founder of the group. Peter spent most of his active career in X-ray astrophysics with emphasis in the development of space-borne instrumentation. He has pioneered two types of instruments that have since been used extensively in the field: the large area multi-wire gas proportional counter and lightweight conical foil X-ray mirrors.

In 1966, Serlemitsos began working on improving the first observational tool: the gas proportional counter. There were several balloon and rocket flights with improved detectors based on innovations that he introduced. An instrument aboard NASA's *Orbiting Solar Observatory* (OSO-8) used three such detectors to conduct pioneering X-ray spectroscopy during its three year (1975–1978) lifetime. The next utilization of these detectors was in NASA's first *High Energy Astrophysics Observatory* (HEAO-1), whose primary aim was the cosmic X-ray background. The *Rossi X-ray Timing Explorer* (RXTE) mission also used the largest and most sensitive counters to study a variety of sources, both galactic and extragalactic.

The second tool that Serlemitsos worked on was an extremely lightweight X-ray mirror for medium resolution imaging and broad-band spectroscopy. He began work on that in the late 1970s. Those mirrors were important because they could be used by relatively small satellites with limited budgets and other resources. The first use in space of these mirrors was onboard the Space Shuttle *Columbia*, which flew NASA's mission *Astro-1* in 1990, with two telescopes, one of which was the *Broad Band X-ray Telescope* (BBXRT), which contained two Goddard-made mirrors.

In 1993, NASA and Japan teamed on a space-borne collaborative instrument: the Advanced Satellite for Cosmology and Astrophysics (ASCA), which used four mirrors. "It is safe to say that an ASCA-type mission could not have been done without them," Serlemitsos said. Suzaku—a second U.S.-Japan collaborative instrument that uses them—is currently in operation orbiting Earth. In NASA's recent competition for small explorers (SMEX), his group was again successful in winning a Mission of Opportunity, which again involves Japan and is slated to conduct extraordinarily sensitive X-ray spectroscopy of cosmic sources. Its launch is slated for 2013.

His scientific interests include iron lines in the spectra of clusters of galaxies, spectra of Active Galactic Nucleus (AGN), and the search with ASCA for hard, AGN-like nuclear sources in nearby spiral galaxies.

For more information on the awards, please visit: http://aas.org/grants/awards.php. For more information about ASCA, visit: http://imagine.gsfc.nasa.gov/docs/features/news/20mar01.html. For more information about the Suzaku mission, visit: http://www.nasa.gov/mission_pages/astro-e2/main/index.html. ■

Spitzer Watches Wild Weather on a Star-Skimming Planet

By Francis Reddy

What would happen if, for a single day, the Sun's light and heat were amplified a thousand times? While this sounds like a classic tale of science fiction, astronomers know of one planet that experiences just such a climate extreme. Now, thanks to NASA's *Spitzer Space Telescope*, scientists have measured how this planet's atmosphere responds to a super-summer day.

The planet in question orbits a Sun-like star cataloged as HD 80606. Part of a binary system, the star is joined in space by a near-twin called HD 80607. These siblings aren't particularly close—they're separated by about 125 times the distance between Saturn and our Sun. The stellar couple lies 190 light-years away in the constellation Ursa Major where, tucked between the Great Bear's front legs, they can be seen through binoculars.

Photo Credit: DSS/STScI/*Aura*

Caption: THD 80606 (right) and its binary partner HD 80607 lie 190 light-years away in Ursa Major. The pair can be seen with binoculars.

HD 80606b was discovered in 2001 by a Swiss planet-hunting team led by Dominique Naef of the Geneva Observatory, Switzerland. It's a gas giant planet, much like Jupiter, but about four times more massive. What makes HD 80606b unique is its orbit, the most elongated yet found, almost as lopsided as the orbit of Comet Halley in our own solar system. Like Halley, HD 80606b spends most of its time far from its star and then, at closest approach, dramatically whips around it.

"There are several other planets with very high eccentricities, but HD 80606b has the highest known," says Greg Laughlin of Lick Observatory, University of California at Santa Cruz. He's the lead author of the study, which appears in the science journal *Nature*.

Every 111 days, HD 80606b shuttles between 79 million miles from its star—equivalent to midway between Venus and Earth in our solar system—and just 2.8 million miles away. That's nearly 13 times closer then Mercury's average distance to the Sun, and less than four times the diameter of HD 80606.

At the farthest part of its orbit, HD 80606b receives a little less than the intensity of solar energy Earth receives from the Sun. But in the 30 hours bracketing the planet's wild swing through closest approach, the energy HD 80606b receives from its star spikes by nearly 830 times.

Laughlin and his colleagues observed HD 80606b before, during, and just after its closest passage to the star on Nov. 20, 2007. The *Spitzer* team didn't know if the planet would disappear completely behind the star. Measurements made with the planet constantly in view could provide the temperature change, but not the actual temperatures. HD 80606b did pass behind its star, and the *Spitzer* measurements show that, over the course of 6 hours, the planet's temperature rose from 980 to 2,240 degrees Fahrenheit.

Astronomers classify HD 80606b as a "hot Jupiter"—a gas giant that lies very close to its star. Usually, such planets rotate in such a way that they keep the same side facing their stars, which makes it impossible for astronomers to observe the hot spots in their atmospheres. This happens because the star raises tides on the planet, much as the Sun and Moon raise tides on Earth. These tides sap energy from the planet's rotation until it spins in synch with the planet's orbital motion—one rotation per orbit.

While most hot Jupiters experience this sort of tidal locking, HD 80606b's odd orbit allows it to maintain a 34-hour rotation. "The planet is spinning at a fast enough rate for the planet's hot spot to come into view," says co-author Drake Deming of Goddard. "The hot spot can't hide."

The team used the data to model how heat flows through the planet's atmosphere—the first time such information has been available for a planet orbiting another star. HD 80606b heats up and cools down fast. This indicates that the stellar energy intercepted by the planet is being absorbed fairly high up in the atmosphere, where the air is relatively thin. "We watched the development of one of the fiercest storms in the galaxy," Laughlin says. "This is the first time that we've detected weather changes in real time on a planet outside our solar system."

Because the scientists detected the planet's disappearance behind the star, there's a 15 percent chance that HD 80606b will transit the star from our viewing angle. The next possibility of detecting HD 80606b in transit falls during February. The event could last up to 17 hours and would provide much additional information on the nature of this peculiar world.

For more information on *Spitzer*, visit: http://www.nasa.gov/spitzer. ■

Lunar Reconnaissance Orbiter Team Trains to Handle Toxic Propellant

By Caitlin Eubank

As the *Lunar Reconnaissance Orbiter* (LRO) prepares for launch in April, one of the tasks for the propulsion team is preparing to load propellant into the spacecraft. The hydrazine propellant that will be used for LRO is highly flammable and extremely toxic. To protect members of the propulsion team and others, self-contained personal protective equipment is required for all personnel involved in hazardous chemical operations. SCAPE, or Self-Contained Atmosphere Protective Ensemble, protects personnel from exposure to toxins, oxygen deficiency, and atmospheric hazards associated with propellant loading operations at the Astrotech Payload Processing Facility. Each SCAPE suit weighs about 60 pounds and includes thick rubber gloves, large rubber boots, an airtight helmet, and a flame-retardant suit. Part of the propulsion team (Code 597) recently traveled to Kennedy Space Center in Florida to train in the use of the suit.

Code 597 engineers and technicians Mike Nunan, Eric Cardiff, Todd Bentley, Hal Baesch, Mark Fiebig, and Caitlin Eubank performed SCAPE training on January 22, 2009. The trainees took this one-day course to be certified in two separate categories: Category I, self-contained Environmental Control Unit (ECU), and Category IV, airline supplied. For Category I, the suit provides complete mobility with no attachment to facility air sources. Within this type of SCAPE suit, an individual carries an internal air supply, which uses cryogenic liquid air with 20–30% oxygen. For Category IV, an individual carries a portable air supply for ingress and egress and must be able to attach and detach to a regulated facility airline supply.

To validate performance, the suits are subjected to high and low temperature operation tests, manned and unmanned carbon dioxide tests, ECU testing in non-vertical attitudes, liquid impingement testing of the ensemble from all attitudes, ensemble exposure testing, and ensemble fire testing. After every wear, the SCAPE suit undergoes thorough maintenance testing. These tests include a white light inspection (searching for small holes), a visual inspection (searching material degradation and damage), an ensemble leak test, an airline flow test, an exhaust valve reverse flow test, and a quality inspection and verification.

LRO propellant loading will take place at the Astrotech facility in early April, before encapsulation in the launch vehicle fairing, to prepare for the launch date of April 24. Propellant loading operations demonstrate the very successful cooperation Goddard has established with Kennedy Space Center, as well as the contracted Astrotech. Goddard began participating in propellant loading operations with the *Tropical Rainfall Measuring Mission* in Japan in 1997. Goddard continued the cooperation with Kennedy, loading propellant for the *Microwave Anisotropy Probe* in 2001, and in 2009 will continue with the LRO and the *Solar Dynamics Observatory* missions. Together, SCAPE suits make hazardous operations safer for the spacecraft, as well as the personnel involved. ■

Photo courtesy of Code 597

Caption: Hal Baesch prepares his communications headset, as well as his Environmental Control Unit.

Photo courtesy of Code 597

Caption: Caitlin Eubank tests agility and dexterity in the suit by picking up a small object underneath a ledge.

Photo courtesy of Code 597

Caption: From left to right: Mike Nunan, Eric Cardiff, Todd Bentley, Hal Baesch, Mark Fiebig, and Caitlin Eubank.

NASA Sees the "Dark Side" of the Sun

By Tony Phillips

NASA researchers have announced an event that will transform our view of the Sun, and in the process, super-charge the field of solar physics for many years to come.

"On February 6, 2011," says Chris St. Cyr of the Goddard Space Flight Center, "NASA's two STEREO (*Solar Terrestrial Relations Observatory*) spacecraft will be 180 degrees apart and will image the entire Sun for the first time in history."

Image credit: NASA

Caption: An artist's concept of one of the STEREO spacecraft.

STEREO's deployment on opposite sides of the Sun solves a problem that has vexed astronomers for centuries. At any given moment, they can see only half of the stellar surface. The Sun spins on its axis once every 25 days, so over the course of a month, the whole Sun does turn to face Earth, but a month is not nearly fast enough to keep track of events. Sunspots can materialize, explode, and regroup in a matter of days; coronal holes open and close; magnetic filaments stretch tight and—snap!—they explode, hurling clouds of hot gas into the solar system. Fully half of this action is hidden from view, a fact that places space weather forecasters in an awkward position. How can you anticipate storms when you can't see them coming? Likewise, researchers cannot track the long-term evolution of sunspots or the dynamics of magnetic filaments because they keep ducking over the horizon at inconvenient times. STEREO's global view will put an end to these difficulties.

The global view is still two years away. Already, however, the two spacecraft are beaming back over-the-horizon images that have researchers and forecasters glued to their monitors.

"This is a perspective we've never had before," says STEREO mission scientist Lika Guhathakurta of NASA Headquarters. "We're now monitoring more than 270 degrees of solar longitude—that's 3/4 of the star. After all these years," she laughs, "we're finally getting to see the 'dark side' of the Sun."

STEREO's journey to the "dark side" began on October 25, 2006, when the twin probes left Earth together onboard a Delta II rocket. High above the atmosphere, they separated and headed for the Moon. What happened next was a first in space navigation. The Moon acted as a gravitational slingshot, flinging the two probes in opposite directions—STEREO-A ahead of Earth and STEREO-B behind. They've been spreading apart ever since. Because of the counterclockwise spin of the Sun, STEREO-B gets a sneak preview of sunspots and coronal holes before they turn to face Earth—a boon for forecasters.

"I know forecasters at NOAA's Space Weather Prediction Center monitor STEREO-B very closely," says St. Cyr. "It lets them know what's coming."

At the moment, STEREO-B enjoys a 3-day look-ahead advantage over Earth-based observatories. This has allowed researchers to predict geomagnetic storms as much as 72 hours earlier than ever before. On several occasions in late 2008, STEREO-B spotted a coronal hole spewing solar wind before any other spacecraft did. When the solar wind hit Earth, STEREO-B's long-range forecast was validated by auroras.

St. Cyr notes that experienced ham radio operators can participate in this historic mission by helping NASA capture STEREO's images. The busy Deep Space Network downloads data from STEREO only three hours a day. That's plenty of time to capture all of the previous day's data, but NASA would like to monitor the transmissions around the clock.

"So we're putting together a 'mini-Deep Space Network' to stay in constant contact with STEREO," says Bill Thompson, director of the STEREO Science Center at Goddard.

The two spacecraft beam their data back to Earth via an X-band radio beacon. Anyone with a 10-meter dish antenna and a suitable receiver can pick up the signals. The data rate is low, 500 bits per second, and it takes 3 to 5 minutes to download a complete image.

So far, the mini-Network includes stations in the United Kingdom, France, and Japan—and Thompson is looking for more, "NASA encourages people with X-band antennas to contact the STEREO team. We would gladly work with them and figure out how they can join our network."

The two STEREO spacecraft rank among the most sophisticated solar observatories launched by NASA. They are equipped with sensors that measure the speed, direction, and composition of the solar wind; receivers that pick up radio emissions from explosions and shock waves in the Sun's atmosphere; telescopes that image the solar surface and all the tempests that rage there; and coronagraphs to monitor events in the Sun's outer atmosphere.

"So, really," says Guhathakurta, "we're not only seeing the Sun's dark side, we're feeling, tasting, and listening to it as well."

To contact the STEREO team, visit:
http://stereo-ssc.nascom.nasa.gov/contact/contact.shtml. ■

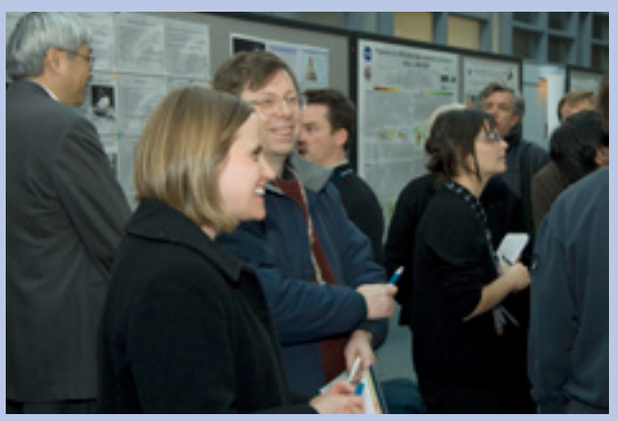
2009 Goddard Sciences and Exploration Directorate Poster Party Blowout

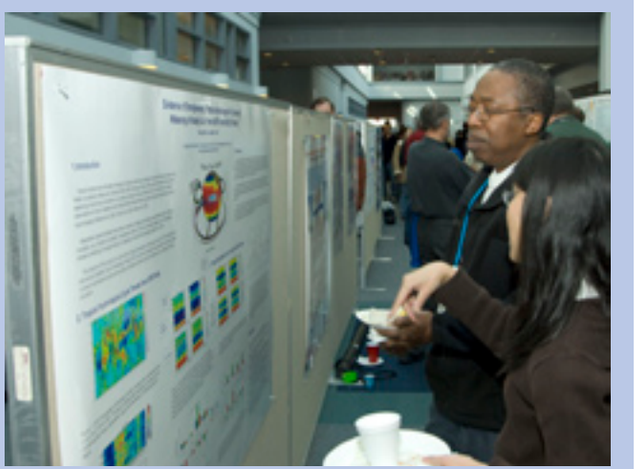
By Yaping Zhou. Photos by Bill Hrybyk

The Sciences and Exploration Directorate's Second Annual New Year's Poster Party was held on January 21, 2009. Goddard scientists gathered in the Building 28 atrium for a display and celebration of Goddard scientific discoveries from 2008. Over 150 posters ranging from Earth sciences to astrophysics were on display to a large crowd that included Center Director Rob Strain.

The party was sponsored by the Deputy Director's Council on Science (DDCS) and was led by Dr. Laurie Leshin, Goddard's Deputy Director, to celebrate the Center's scientific discoveries and achievements, and to foster communication and collaboration between Goddard scientists. The first annual party, held January 18, 2008, was such a great success that the DDCS decided to hold it annually every January as a celebration of the New Year.

The posters were randomly displayed purposely to provide mingling opportunities for scientists from different disciplines. To add to the fun of the event, surprise awards were given to some posters based on non-content–based criteria such as graphic design and readability. A special award was given to best science inspired food. The awardees were invited to a special lunch with Dr. Leshin. ■





Employee Spotlight: Anita Krishnamurthi

By April Thornton

Photo credit: Pat Izzo

Caption: Anita Krishnamurthi.

Anita Krishnamurthi is an astrophysicist at Goddard in Code 660. She is the Lead for Education and Public Outreach in the Astrophysics Science Division. Anita knew early on that her future lay among the stars, "I was very interested in astronomy from a very young age and I always knew that I wanted to get a Ph.D. in astronomy."

When asked who inspired her fascination with astronomy, Anita replies, "My older brother, who is not a scientist, was a voracious reader and talked to me about all sorts of things—literature, politics, and science. We used to go on walks and look up at the night sky. When he talked about the concept of light travel time, I was hooked. The thought of being paid to learn how the universe worked was incredibly exciting and all other careers paled in comparison." This fascination and curiosity only increased as she grew older.

Another strong influence in Anita's life was her experience growing up in India and seeing first-hand the importance of education to those born in poverty. She strongly believes that, "A good education opens doors and serves as a great equalizer since we can't control where we are born." This is what ultimately pushed her to choose a career in science education so she could engage the minds of students and direct their interest.

Anita was born and raised in Bangalore, India. She came to the United States in 1991 and attended The Ohio State University in Columbus, Ohio, where she received a master's degree and Ph.D. in astrophysics. She later attended the University of Colorado in Boulder as a Postdoctoral Fellow. After accomplishing her educational goals, she made many career moves.

Because she was considering a transition from research to education, Anita volunteered at a non-profit organization doing technology outreach in Boulder. She then moved to Washington, D.C., and worked for the National Academy of Sciences. At the Academy, she was a Program Officer in the Office on Public Understanding of Science.

Prior to landing the position at Goddard Space Flight Center, Anita was at NASA Headquarters on an Interagency Personnel Agreement from the University of Maryland. While at NASA Headquarters, she served as one of the Program Managers for space science education.

Since arriving at Goddard in 2005, Anita has worked on many different Education and Public Outreach (EPO) projects for the Astrophysics Science Division. Anita is not only the EPO lead for the Astrophysics Science Division at Goddard, she is also the EPO lead for the *James Webb Space Telescope* and NASA's "Beyond Einstein" and "Physics of the Cosmos" programs.

One of the programs Anita initiated and leads is Afterschool Universe, an astronomy program for middle school students. This program has been adopted across the country in afterschool programs, community-based organizations, the Girl Scouts, by teachers who run science clubs, and other venues.

When asked about her work, Anita says, "It is a lot of fun to work on these programs and bring the universe down to Earth for both the adults and kids we work with. My colleagues in the EPO group are an extraordinarily talented and dedicated group of people, and it's a pleasure and a privilege to work with them."

Anita's schedule is hectic and busy, but in her spare time she enjoys hiking, rock climbing, pottery, reading, listening to music, gardening, and traveling. Anyone who comes across Anita will know that she is passionate, energetic, and dedicated.

Anita's message to individuals considering a career in science, math, or technology is, "Think of science as a wonderful tool to understand the world and universe around you. Don't worry about exactly what job you will get if you study science, but just start the journey and have fun learning. And then if you just follow your enthusiasm for the subject or issue that interests you most, you will find a job doing what you love. And remember that life is dynamic and it's OK to adjust your career path as your interests change." ■